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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/621,891	07/16/2003	Masataka Ito	273855US90	1485

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OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, P.C.
1940 DUKE STREET
ALEXANDRIA, VA 22314

EXAMINER	
PEACE, RHONDA S	

ART UNIT	PAPER NUMBER
2874	

NOTIFICATION DATE	DELIVERY MODE
01/25/2008	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

patentdocket@oblon.com
oblonpat@oblon.com
jgardner@oblon.com

Office Action Summary	Application No.	Applicant(s)	
	10/621,891	ITO ET AL.	
	Examiner	Art Unit	
	Rhonda S. Peace	2874	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on *31 October 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-4,6,7,9-11,15-19,21-30,32-40,42-49,51,52 and 54-59* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4,6,7,9-11,15-19,21-30,32-40,42-49,51,52 and 54-59* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *16 November 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 10/31/2007 has been entered.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein

were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-4, 6, 7, 9-11, 15-19, 21-30, 32-40, 42-49, 51, 52, and 54-59 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kakii et al (US 5764833), in further view of Nakanishi et al (US 6655856), in further view of Porter et al (US 2004/0228601).

Regarding claims 1, 10, and 44, Kakii et al discloses an optoelectronic communication module comprising the following:

- Optical fibers **1** terminating in facets on an end face of an optical block **F** (column 12 lines 6-18, hereafter indicated in the form 12:6-18, Fig 20).
- A module **31** joined to the end face of block **F**, where the module **31** contains a laser diode array **33** (12:6-18, Fig 20).

With regard to the module 31, Kakii et al does not disclose in any lengthy detail the specific construction of the module, and instead describes the module as conventional. Therefore, Kakii et al does not disclose bonding the laser to the submount, the inclusion of driver circuits, and the inclusion of a cap that encloses the laser diode array and fiber facets.

Continuing with claims 1, 10, and 44, Nakanishi et al discloses an optical module having a laser diode **30** and associated driver circuits **31** bonded to a submount **27** that

is topped by cap **37** (9:1-15 and 24-31, Fig 3). The cap **37** is detachable from the submount **27** prior to the curing of resin **36** (5:7-11). In Figures 10-17, Nakanishi et al shows various embodiments of the submount **27** in combination with the cap **37**. Resins **35** and **36** are used to fill the enclosure formed by the submount and cap, and provide to bond the fiber array, cap, and submount to one another, thereby hermetically sealing the enclosure. The laser **30** and fiber facets are encapsulated by silicone resin **30**, which is substantially transparent to light waves passing between the fiber and the laser. Resin **36** is used to provide a hard outer covering to resin **35**, and bonds the fiber to the submount and cap (5:7-11, 9:24-31, Fig 3).

As it has been held that forming in one piece an article formerly formed in two pieces (*Howard v. Detroit Stove Works*, 150 U.S. 164 (1893)), as well as forming a formerly integral structure in various elements (Nerwin v. Erlichman, 168 USPQ 177, 179), involves only routine skill in the art and is within one of ordinary skill in the art, it becomes apparent that a wide range of variations for the fitting of a cap to a submount is obvious in view of Nakanishi et al. For example, an obvious variant of the embodiment shown in Figure 11 of Nakanishi et al would be an encasement where submount **75** does not include the enclosing side walls **25** (as is seen in Figure 13), and the enclosing side walls **25** of Figure 14 are made integral with the cap **37**, thereby forming a flat submount having a U-shaped cap fitted thereon. This orientation would allow the cap **37**, with sidewalls **25**, to contact and be fixed to both the fiber **34**, as well as the submount portion **75**, and fully enclose the fiber's (**34**) end face and the laser diode **30**. Note that the cap **37** and sidewalls **25** may be considered a "spacer."

Further continuing with claims 1, 10, and 44, it would have been obvious to one of ordinary skill in the art to combine module encasing structure (or any obvious variant thereof) with the overall coupling structure taught by Kakii et al, as the module of Nakanishi et al provides an excellent seal against environmental contaminants, allows the use of silicone resin in a more accurate fashion, which is advantageous, as the proper use of silicone resin allows for the elimination of previously required elements, such as lenses, and therefore allows the module to be produced at a minimized size and reduced cost (Nakanishi et al 1:64-67, 2:1-15, 3:4-15, 4:30-37, 5:7-26).

As previously discussed, several variations of the embodiments shown in Figures 10-17 of Nakanishi et al are considered obvious to one of ordinary skill in the art. For example and referring to Figure 15 of Nakanishi et al, the submount may contain the plate **75** and a portion of the left-most side wall **25**, while the cap contains upper plate **37**, a portion of the left-most side wall **25**, as well as all of right-most the side wall **25** as a unitary cap piece. Moreover, sidewalls **25** may be separated from the submount **75**.

In conclusion with respect to claims 1, 10, and 44, Kakii et al, in view of Nakanishi et al, discloses the optical system and associated method as described above. However, neither discloses an injection hole in said cap (or spacer) for injecting the resin into the chamber, thereby allowing the placement of resin to be the last step in the manufacturing process. Porter et al discloses a hole **36** for injecting resin into a chamber **37** (paragraph 0100, Fig 1). It would have been obvious to one of ordinary skill in the art to combine the teachings cited above with those of Porter et al (utilize a hole for the placement of resin), as this allows the precise placement of the resin within

the chamber upon assembly of the optical device (Porter et al: 0100). It would be obvious to one of ordinary skill in the art to place the hole through the cap of the module or through a sidewall of the module, as this provides the easiest access for the user to administer the liquid resin via needle. In addition, Nakanishi et al teaches their module is completely filled with resin from the upper portion ("cap") of the module (Figures 14-15), as the resin is capable of flow while uncured, and therefore filling the module with resin from a hole in the cap would have been obvious to one of ordinary skill in the art, as this ensures said resin will not leak outside the module prior to the curing process (while allowing the complete encapsulation of the components within said module), as it would, for example, if the resin were injected through a hole in the side of the module.

With respect to claims 2, 6, 7, 9, 16, 17, 45, and 46, Kakii et al, in view of Nakanishi et al and Porter et al, discloses the optical system as described above. To further elaborate on the teachings of Nakanishi et al, resins **35** and **36** are used to fill the enclosure formed by the submount and cap, and provide to bond the fiber array, cap, and submount to one another, thereby hermetically sealing the enclosure. The laser **30** and fiber facets are encapsulated by silicone resin **30**, which is substantially transparent to light waves passing between the fiber and the laser. Resin **36** is used to provide a hard outer covering to resin **35**, and bonds the fiber to the submount and cap (5:7-11, 9:24-31, Fig 3).

Concerning claims 3, 4, 11, 47-49, 51 and 52, Kakii et al, in view of Nakanishi et al and Porter et al, discloses the optical system as described above. As previously discussed, several variations of the embodiments shown in Figures 10-17 of Nakanishi

et al are considered obvious to one of ordinary skill in the art. For example and referring to Figure 15 of Nakanishi et al, the submount may contain the plate **75** and a portion of the left-most side wall **25**, while the cap contains upper plate **37**, a portion of the left-most side wall **25**, as well as all of right-most the side wall **25** as a unitary cap piece. Moreover, sidewalls **25** may be separated from the submount **75**.

With regard to claims 18, 25, and 54, Kakii et al, in view of Nakanishi et al and Porter et al, disclose the optical system as disclosed above, and further disclose a method of forming such an optical system comprising:

- Providing an optical fiber block **F** supporting a plurality of fibers **1** each terminating in a face on an end face of the block **F** (Kakii et al: 12:6-18, Fig 20).
- Bonding block **F** to an optical module **M** along the fiber facet (Kakii et al 12:6-18, Fig 20).

As discussed above, it would be obvious to one of ordinary skill in the art to use the module of Nakanishi et al in place of the module **M** shown in Figure 20. Correspondingly, Nakanishi et al specifically discloses the method of forming the following:

- Providing a submount **75** (7:38-43, Fig 15).
- Bonding laser diode **30** to the submount **75** (Fig 5, 9:12-13).
- Affixing a containment dam having sidewall portions **25** and cap portion **37** to submount **75** for defining a fluid containment enclosure that encompasses the laser **30** and the fiber's end face. A portion of the

containment dam is interposed between said submount **75** and the fiber **34** (9:24-31 and 58-63, Fig 3).

- Optically aligning the submount **37**, containment dam **25** and **37,** and laser **30** with a fiber **34** (Fig 3).
- Applying a liquid resin **35** and **36** to encapsulate the laser **30** (9:24-32, Fig 3), and thereby bond the containment dam and submount to the fiber **34**.

Further with regard to claims 18, 25, and 54, Porter et al discloses the method of forming a hole **36** for injecting resin into a chamber **37** (paragraph 0100, Fig 1). As previously discussed, it would have been obvious to one of ordinary skill in the art to combine the teachings cited above with those of Porter et al (utilize a hole for the placement of resin), as this allows the precise placement of the resin within the chamber upon assembly of the optical device (Porter et al: 0100). Moreover, Nakanishi et al teaches their module is completely filled with resin from the upper portion ("cap") of the module (Figures 14-15), as the resin is capable of flow while uncured, and therefore filling the module with resin from a hole in the cap would have been obvious to one of ordinary skill in the art, as this ensures said resin will not leak outside the module prior to the curing process (while allowing the complete encapsulation of the components within said module), as it would, for example, if the resin were injected through a hole in the side of the module.

Pertaining to claims 21, 24, 29, 32, 35-40, and 55-59, Kakii et al, in view of Nakanishi et al and Porter et al, disclose the optical system and associated method as described above. Moreover, as it has been held that forming in one piece an article

formerly formed in two pieces (*Howard v. Detroit Stove Works*, 150 U.S. 164 (1893)), as well as forming a formerly integral structure in various elements (Nerwin v. Erlichman, 168 USPQ 177, 179), involves only routine skill in the art and is within one of ordinary skill in the art, it becomes apparent that a wide range of variations for the fitting of a cap to a submount is obvious in view of Nakanishi et al. For example, an obvious variant of the module disclosed by Nakanishi et al would include the following (which are explained with reference to Figure 15):

- A system having a submount **75**, and a cap mounted thereon comprising three sidewalls **25** and a top portion **37**. As Nakanishi et al discloses the cap **37** may be bonded to the structure of Figure 15 (11:35), it would be obvious to one of ordinary skill in the art to bond the modified cap structure explained herein to its underlying submount.
- A system having a submount **75** and a cap mounted thereon having a separate top portion **37** and three side walls **25**, where the open end of the resulting structure is fitted with the fiber block, where the side walls are assembled first with the underlying submount (Fig 14), and the top portion **37** is then affixed atop the side walls **25** (Fig 15).
- A system having a submount **75** with side walls **25** extending upward to a point where the fiber **34** is introduced, and a cap structure having a top portion **37** and side wall portions **25** extending downward from the top portion **37**, such that the side wall **25** of the submount **75** is adhered to the end face of the fiber block.

- A system as discussed immediately above where the top portion **37** is separate from cap structure, where the top portion **37** is affixed to the sidewalls **25** to create the containment dam.
- A system where the side wall **25** closest to the fiber serves as a spacer separate from the submount **75**, such that one surface of the spacer is bonded to the submount **75**, and the opposing side is bonded to the fiber block.
- A system where the sidewalls **75**, base **75**, and cap **37** forms a closed perimeter spacer placed around submount **26**.

Concerning claims 19, 26-28, and 30, Kakii et al, in view of Nakanishi et al and Porter et al, disclose the optical system and associated method as described above. As before, resins **35** and **36** are used to fill the enclosure formed by the submount and cap, and provide to bond the fiber array, cap, and submount to one another, thereby hermetically sealing the enclosure. The laser **30** and fiber facets are encapsulated by silicone resin **30**, which is substantially transparent to light waves passing between the fiber and the laser. Resin **36** is used to provide a hard outer covering to resin **35**, and bonds the fiber to the submount and cap (5:7-11, 9:24-31, Fig 3). Moreover, the alignment process requires the fixing of the submount to the fiber block, as the resin is poured upon placement of the fiber relative to the laser, and it is the pouring of the resin that constitutes the alignment process (4:66-67, 5:1-6).

Pertaining to claims 15, 22, 23, 33, 34, 42, and 43, Kakii et al, in view of Nakanishi et al and Porter et al, discloses the optical system and associated method as

described above. As previously discussed, Porter et al discloses a hole **36** for injecting resin into a chamber **37** (paragraph 0100, Fig 1). It would have been obvious to one of ordinary skill in the art to combine the teachings cited above with those of Porter et al, as this allows the precise placement of the resin within the chamber (Porter et al: 0100). Nakanishi et al teaches their module is completely filled with resin from the upper portion ("cap") of the module (Figures 14-15), as the resin is capable of flow while uncured, and therefore completely filling the module with resin from a hole in the cap and further filling the hole itself would have been obvious to one of ordinary skill in the art, as this ensures said resin will not leak outside the module prior to the curing process (while allowing the complete encapsulation of the components within said module and the module itself), as it would, for example, if the resin were injected through a hole in the side of the module. At the very least, it would be obvious to one of ordinary skill in the art to place the hole through the cap of the module or through a sidewall of the module, as this provides the easiest access for the user to administer the liquid resin via needle.

Response to Arguments

Applicant's arguments filed 10/31/2008 have been fully considered but they are not persuasive.

Applicant argues with respect to claims 1, 10, 18, 25, 44, and 54, that the combination of Kakii et al, Nakanishi et al, and Porter et al fails to disclose a cap, or spacer, having a hole therein for introducing resin in an initially fluid uncured state into the module chamber, as claimed in the above claims. Applicant argues Porter et al

merely discloses the general concept of injecting epoxy into a hole, without disclosing that the hole is provided in the cap of said enclosure. Moreover, Applicants argue as Porter et al refers to visual alignment mechanism for a collimator and a beam spreader, and not an optoelectronic module, Porter et al is not applicable to either Kakii et al or Nakanishi et al. The Examiner respectfully disagrees.

As discussed above, while Porter et al does not specifically disclose the hole being formed in the cap, or upper-most portion, of their device, such hole placement is obvious in view of the combination of Kakii et al, Nakanishi et al, and Porter et al, as the injected resin is capable of flow while in an uncured state, and therefore a hole placement in the uppermost portion (i.e. cap) of any enclosure prevents any resin from escaping said enclosure. Moreover, Nakanishi et al clearly shows resin added from the top of the module to completely encase the module in resin. Such an arrangement is not possible if liquid resin is injected from a hole in the side of the module.

Moreover, while Porter et al does not disclose an optoelectronic module, its teachings are nonetheless applicable to those of Kakii et al and Nakanishi et al, as both are related in the field of optical arts. Porter et al simply shows it is known and preferable to apply resin though a hole formed in the wall an enclosed space, so that optical elements within said space are protected from environmental stress. Porter et al is particularly relevant to Nakanishi et al, as Nakanishi et al deals with the complete filling of an optical module with transparent resin. Porter et al illustrates a more precise manner of applying resin to an optical device.

Conclusion

The following art made of record and not relied upon is considered pertinent to applicant's disclosure: Souda et al (US 2003/0210874), Yamada (US 7075177), and Furuyama et al (US 5412748).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rhonda S. Peace whose telephone number is (571) 272-8580. The examiner can normally be reached on M-F (8-5).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rodney Bovernick can be reached on (571) 272- 2344. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Rhonda S. Peace
Examiner
Art Unit 2874

/Michelle R. Connelly-Cushwa/
Primary Examiner
January 22, 2008